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ABSTRACT

This research project on environmental education was designed to implement and evaluate a community action curriculum development model concerned with the preservation and enhancement of environmental quality and ecological balance within an urban area. It sought, furthermore, to involve students, teachers, parents, community representatives, school administrators, public school curriculum specialists, and university personnel in all stages of the project. Each of the objectives of the project, and its realization, is discussed in detail. The four objectives are: (1) Implementation and evaluation of a developmental curriculum model used to generate effective urban environmental curricula; (2) implementation, revision, and evaluation of the environmental leadership and inservice teacher education modules; (3) implementation, revision, and evaluation of the eight instructional modules; and (4) dissemination of the research findings and recommendations and the revised curricula and instructional program. (Author/HC)

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P.E.A.C.E.

(Project in Environmental Action/Community Education)

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URBAN ENVIRONMENTAL CURRICULA

General Perspective

Urban educators concerned about environmental education must find better ways to develop and implement effective curricula. Dynamic models are needed that (1) have relevance for persons living in urbanized areas, (2) go beyond merely arousing affective awareness and imparting isolated bits of information to the development of intelligent action, and (3) are aimed at a wider audience than that typically serviced by primary and secondary schools. The need exists for finding strategies to develop and implement effective action-oriented and community based curricula aimed at preserving and enhancing environmental quality and ecological balance in urban areas.

Developing environmental curricula with an urban orientation is a pressing need for educators. There is no reason to suppose, for example, that urban environmental conditions have improved or even stabilized since the President's Council on Recreation and Natural Beauty reported in 1968 that, "One of the most ominous threats to the environment lies in the failure of man thus far to provide humane solutions to the problems posed by the spread of his own numbers. No major urban center in the world has yet demonstrated satisfactory ways to accomodate growth." While it would be naive at best to suppose that educators are able to solve our urban environmental problems, it does not seem unreasonable to expect that they should search for and attempt to develop programs for effectively educating residents to be able to take intelligent action aimed at dealing with urban environmental problems.

It is at best difficult to see the impact of environmental education programs which take urban residents to rural or wilderness areas. While such

programs may develop in their clients an appreciation of nature and survival skills, the transfer of learning outcomes from such experiences to the solution of urban environmental problems appears limited. An urban environmental education program must deal with the problems and needs which arise in urban environments or at least ensure that educational activities which occur in non-urban environments are shown to be related to urban problems. A problem in environmental education aimed at urban residents appears to have the best chance of being relevant to such clients if it deals directly with the needs and problems arising in an urban setting. A program developed by and for urban residents may have the best chance of being relevant to and meeting the needs of those living in these areas.

Substantive as well as relevant urban education curricula are needed. Our citizenry needs to be educated in the process of making intelligent value choices and of translating these choices into courses of action if it is to be capable of doing more than merely being congnizant of its own demise. The need exists for environmental education curricula that combine effective awareness, knowledge, and cognitive abilities with an action oriented model for valuing.

Effective environmental education also needs to be aimed at an audience broader than that normally serviced by elementary and secondary schools. It seems unrealistic to prepare future citizens to deal with current problems, while allowing adults who comprise the present voting and decision-making populance to formulate judgements about environmental issues without a guiding conceptual framework. An adequate program needs to be community based and oriented rather than being limited to the typical clientele served by elementary and secondary schools.

Developing and implementing curricula designed to meet the needs outlined above must be undertaken with an awareness of the problems which have beset prior

curriculum development efforts. Specifically, problems related to translating nationally and professionally developed curricula into instructional programs need to be taken into account in suggesting the development of an urban environmental curriculum. Curricula developed that are remote from the teachers, learners, administrators, and community representatives who actually implement and use them appear to encounter (1) dysfunctional resistance, (2) total rejection, (3) mis-application by teachers and administrators, (4) lack of appropriate and necessary materials, and (5) high implementation costs. A model for curriculum development is needed which reduces or alleviates such problems from the curriculum development process itself.

Focus of Current Research

Given the preceeding considerations, the current research was designed to implement and evaluate a community action curriculum development model concerned with the preservation and enhancement of environmental quality and ecological balance within an urban area. Further, it was stipulated that students, teachers, parents, community representatives, school administrators, public school curriculum specialists, and university personnel would cooperatively develop, implement, and evaluate an operational curriculum and its supportive instructional strategies.

It is important to emphasis that representatives of each of these groups are involved in all stages of the project from planning through implementation and evaluation. It is also important to recognize that this research is not limited to one selected locale. On the contrary, it is designed to impact at the national, regional, state, and local levels.

OBJECTIVES

Specific tasks to be accomplished in the project are described in the sequence of process objectives that follows:

Objective 1: Implementation and formative evaluation of a developmental curriculum model used to generate effective urban environmental curricula.

Objective 2: Implementation, revision, and evaluation of the environmental leadership and in-service teacher education modules.

Objective 3: Implementation, revision, and evaluation of the eight instructional modules.

Objective 4: Dissemination of the research findings and recommendations and the revised curricula and instructional program.

THEORETICAL FRAMEWORK

Description of the Model

The curriculum model developed for the current research is based on three premises. First, it is assumed that the process of curriculum development must involve educators as well as representatives from groups for whom the curriculum is intended. Effective curriculum development needs to be viewed as a system which involves personality structures in social settings as well as subject matter and instructional methodology. Thus, teachers and learners are viewed as an important element in curriculum development.

Second, an effective urban environmental curriculum must be comprehensive in scope. Curricular materials, instructional strategies, and learning modules must be designed to accommodate the interests and needs of relevant consumer groups. Consequently, the curriculum model used in the present study is designed to maximize its generalizability and transferability. Operationally, the model is intended to be applicable to all segments of our society, taking in account such characteristics as socio-economic, political, cultural, philosophical, and other factors.

Third, it is necessary to identify organizing centers around which instructional strategies and curriculum materials can be organized. Utilizing these fundamental premises, the conceptual framework illustrated in Figure 1 was created.

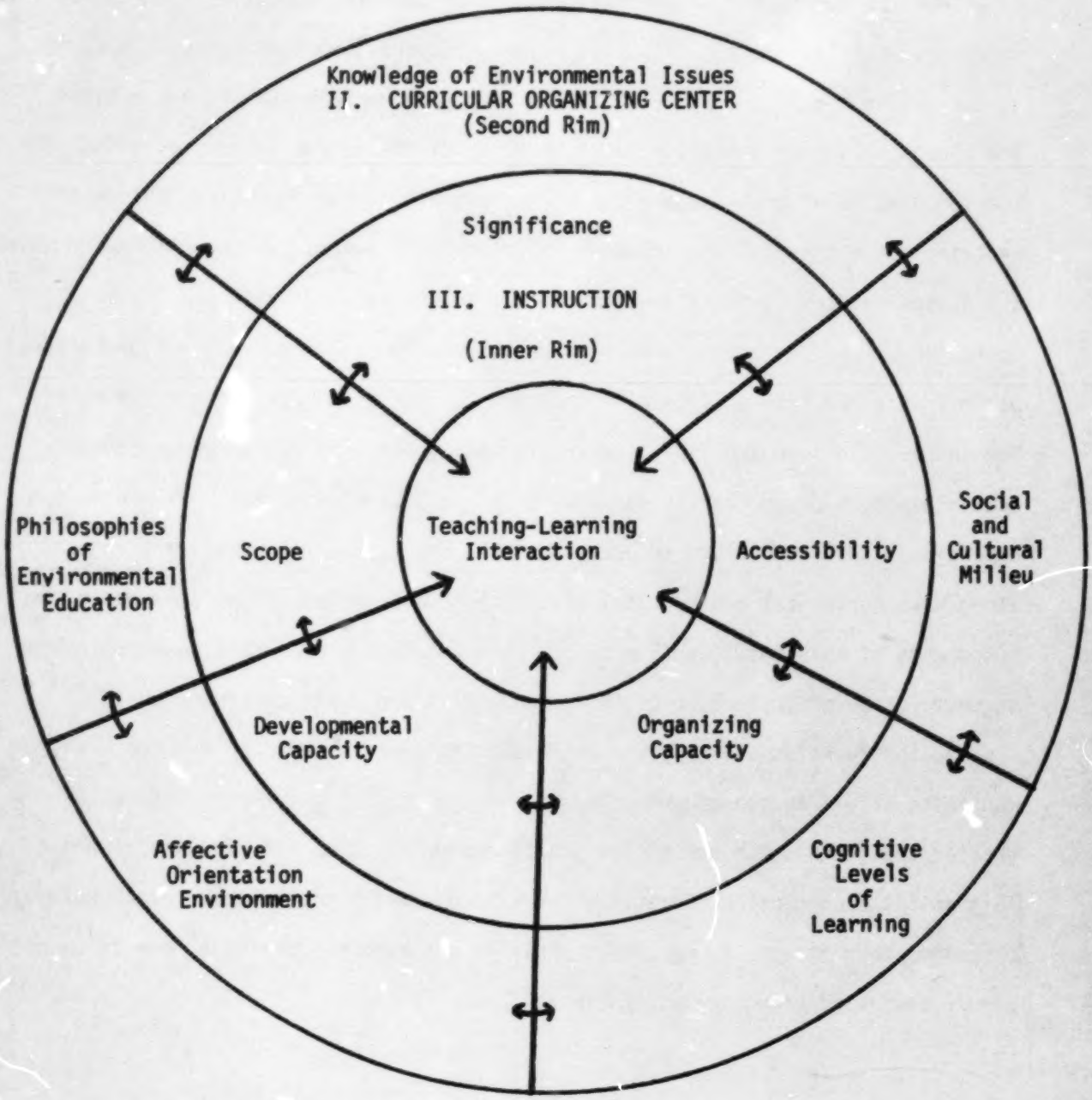

Figure 1
Conceptual Framework for Environmental Education

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Figure 1 is a graphic representation of the conceptual framework used to assess the curricular potentialities of environmental education. The three concentric circles identify distinct planes of curriculum operations. Thus, it is acknowledged that there are different levels of decision-making and actions. The elongated arrows extending from the outer circle to the inner circle indicate the temporal relationship among the planes as well as the general direction of evolving activities. These arrows also suggest the interdependence of the decisions and actions at the various levels and point to the focus of all curriculum operations, i.e.; teaching-learning interaction. As illustrated, each operational plane is divided into analytically discrete constellations of dynamic variables. The interrupted boundary lines and the two-way connecting arrows denote interactions among subsumed variables as well as whole constellations. Viewed in two dimensions, this conception reveals simultaneous interrelationships and interactions along both horizontal and vertical axes. The complementary interfaces among the components of this total "action system" are indicative of a continuous spiraling sequence of events. Because of the complexities and dynamics of the whole system, intervention at any given point sets into motion a "ripple-effect" that manifests itself in subsequent occurences. The resulting synergy produces a greater change than the sum of the independent efforts of the separate elements. This holistic conception of reality tends to discredit traditional "black-box" paradigms that attempt to describe, explain, and predict curricular phenomena as simple cause-and-effect relationships.

Application of the Framework

For the purpose of the current study, the foundations level shown in Figure 1 is divided into four constellations of variables. Collectively, these sources of inputs are considered essential for developing personalized urban environmental

curricula. For example, the affective realm contains the individual's (a) perceptions, (b) expectations, (c) anxieties, and (d) characterizations relative to his/her immediate environment. The cognitive levels of learning incorporate such variables as a person's learning style and his/her present capacity to comprehend abstraction, such as aesthetics and urbanized environments. Sanitiation systems, noise pollution, and use of land are examples of specific referents in the social and cultural domain. The knowledge category includes a number of variables ranging from specific bits of demographic data to established generalizations regarding the environment. Pragmatism and existentialism are representative of basic orientations in the philosophical realm.

Using the foundations level as a departure point, attention is directed toward the following concerns in the present study: (1) Is the knowledge of environmental issues adequate for developing school curricula? (2) Will the present social and cultural milieu support the development and implementation of community action oriented education? (3) Are existing philosophies compatible with values and valuing processes advocated for contemporary school curricula? (4) Will the cognitive levels of learners permit the assimilation and/or accommodation of concepts of environmental education? (5) Can the affective orientations of youth and adults toward environment be modified through in-school educative experiences?

Should adequate foundations exist, then it is possible to move to the next level of curriculum operation, i.e., selecting curricular organizing centers. Characteristics of effective centers, as discussed by Herrick (1965), Taba (1962), Goodland (1964), and Bennett (1974) are identified in the middle circle of Figure 1. In the present investigation these qualities were re-defined as follows:

1. Significance. The organizing center should have a high degree of personal importance for the learners. It also should have considerable potential in the field of environmental education, i.e., the study of natural phenomena. Finally, the center must be generally valued in the culture.

2. Accessibility. The organizing center should be easily available to the learners. Some mix of cognitive, affective, and psycho-motor interaction should be possible with the center.

3. Organizing Capacity. The center should link past, present, and future educative experiences. It also should relate ideas, decisions, actions, and consequences. In addition, it should provide a focal point of attention for many kinds of learning.

4. Developmental Capacity. The organizing center should be open-ended, permitting learners to extend their own levels of understanding. Divergent thinking should be facilitated by using the center. Higher levels of cognition and affective valuing also must be attainable.

5. Scope. The organizing center must be sufficiently multidimensional to allow analyses from several perspectives, e.g., economic, social, or political. The center should have meaning for a broad range of people as opposed to being relevant only to a select group.

6. Mobility. Lastly, the center should possess a high degree of mobility, i.e., it can move through various (a) time periods, (b) cultures, (c) socio-economic systems, and (d) educational rationales.

With respect to the current research, specific concerns arising at this level were derived from the following general question: Do environmental issues exhibit the characteristics of an effective curricular organizing center?

"Teaching-Learning Interaction" appears as the vortex of all curriculum activity in the conceptual framework illustrated in Figure 1. Operationally, this construct is visible in the reciprocal exchanges of cognitive, verbal, and affective behaviors among students and teachers. Underlying personal values and overt communication systems exemplify some of the implicit variables that influence total interaction patterns. Concerns at this level of curriculum operation emanated from the following overarching inquiry: Can teaching and learning systems, as defined by Macdonald (1965), adjust sufficiently to maximize positive educative experiences within environmental curricula?

Instructional Strategies

Teachers and school administrators are seen in the present research as having the technical expertise needed to develop a curriculum and translate it into instructional strategies. Therefore, they have the primary responsibility for the development of the environmental education program. Parents, community representatives, and students, on the other hand, possess values and interests which determine the effectiveness and relevance of the learning opportunities contrived by the educators. Consequently, these three groups are actively involved in planning instruction, i.e., establishing objectives, selecting content, and organizing activities. It is the task of the university educators and public school curriculum specialists to facilitate these collaborative efforts.

Eight instructional modules were developed to deal with major environmental issues and problems of concern in Memphis within the curricular framework described earlier. Each of these instructional modules deals with one of eight themes determined by an interdisciplinary advisory team to be relevant to the urban environmental situation in Memphis. The eight themes identified for the modules focused on environmental development and planning, social services, aesthetics, resource management, cultural dynamics, environmental ethics, leisure activities, and transportation and communication. These themes are viewed as being easily included within the present science and social studies curricula of the Memphis City Schools at the junior high level.

Recognizing the need for an action oriented valuing process in environmental education, the model developed by Raths, Harmin, and Simon (1966) was used as one departure point for planning the eight instructional modules. As described by its developers, this model for valuing includes three steps: (1) choosing freely from among alternatives after thoughtful consideration of the consequences

of each alternative course of action, (2) public affirmation of the chosen alternative as an indication that the choice is cherished, and, (3) doing something repeatedly with the choice in some pattern of life. This model suggests the need for three types of objectives and corresponding learning opportunities. It also suggests a sequence for these types of objectives and opportunities.

Since the first step in the valuing process entails the formulation and evaluation of a course of action, Bloom's (1956) taxonomy of cognitive behavior was used to formulate the specific objectives and structure learning activities for the instructional modules. The levels of cognitive behaviors identified by Bloom and his colleagues are organized in the following hierarchy:

1. Knowledge (lowest level of cognitive behavior)
2. Comprehension
3. Application
4. Analysis
5. Synthesis
6. Evaluation (highest level of cognitive behavior)

Evaluation as defined by Bloom and his colleagues requires that reasons be given for selecting courses of action. For purposes of values clarification, Kohlberg's (1975) scheme of moral reasoning was used as a framework for evaluating and ordering the types of reasons which learners give for a selected course of action. The stages of moral reasoning identified by Kohlberg are as follows:

1. Preconventional level
   At this level the child is responsive to cultural rules and labels of good and bad, right or wrong, but interprets these labels either in terms of the physical or the hedonistic consequences of action (punishment, reward, exchange of favors) or in terms of the physical power of those who enunciate the rules and labels. The level is divided into the following two stages:

   Stage 1: The punishment and obedience oreintation. The physical consequences of action determine its goodness or badness regardless of the human meaning or value of these consequences. Avoidance of punishment and unquestioning deference to power are valued in their own right, not in terms of respect for an underlying moral order supported by punishment and authority (the latter being stage 4).

Stage 2: The instrumental-relativist orientation. Right action consists of that which instrumentally satisfies one's own needs and occasionally the needs of others. Human relations are viewed in terms like those of the market place. Elements of fairness, of reciprocity, and of equal sharing are present, but they are always interpreted in a physical pragmatic way. Reciprocity is a matter of "you scratch my back and I'll scratch yours," not of loyalty, gratitude, or justice.

II. Conventional level
At this level, maintaining the expectations of the individual's family, group, or nation is perceived as valuable in its own right, regardless of immediate and obvious consequences. The attitude is not only one of conformity to personal expectations and social order, but of loyalty to it, of actively maintaining, supporting, and justifying the order, and of identifying with the persons or group involved in it. At this level, there are the following two stages:

Stage 3: The interpersonal concordance or "good boy-nice girl" orientation. Good behavior is that which pleases or helps others and is approved by them. There is much conformity to stereotypical images of what is majority or "natural" behavior. Behavior is frequently judged by intention--"he means well" becomes important for the first time. One earns approval by being "nice."

Stage 4: The "law and order" orientation. There is orientation toward authority, fixed rules, and the maintenance of the social order. Right behavior consists of doing one's duty, showing respect for authority, and maintaining the given social order for its own sake.

III. Postconventional, autonomous, or principled level
At this level, there is a clear effort to define moral values and principles that have validity and application apart from the authority of the groups or persons holding these principles and apart from the individual's own identification with these groups. This level has two stages:

Stage 5: The social contract, legalistic orientation, generally with utilitarian overtones. Right action tends to be defined in terms of general individual rights and standards which have been critically examined and agreed upon by the whole society. There is a clear awareness of the relativism of personal values and opinions and a corresponding emphasis upon procedural rules for reaching consensus. Aside from what is constitutionally and democratically agreed upon, the right is a matter of personal "values" and "opinion". The result is an emphasis upon the "legal point of view," but with an emphasis upon the possibility of changing law in terms of rational considerations of social utility (rather than freezing it in terms of stage 4 "law and order"). Outside the legal realm, free agreement and contract is the binding element of obligation. This is the "official" morality of the American government and constitution.

Stage 6: The universal-ethical-principle orientation. Right is defined by the decision of conscience in accord with self-chosen ethical principles appealing to logical comprehensiveness, universality, and consistency. The principles are abstract and ethical (the Golden Rule, the categorical imperative); they are not concrete moral rules like the Ten Commandments. At heart, these are universal principles of justice, of the reciprocity and equality of human rights, and of respect for the dignity of human beings as individual persons.

The stages of moral reasoning identified by Kohlberg not only provide a basis for evaluating courses of action selected by a student or group of students, but also provide a basis for adjusting learning activities to the appropriate educational level of the student.

CURRICULUM-INSTRUCTION INTERFACE

Figure 2 illustrates the interrelationships and interactions among curriculum development and instructional variables in the current research. The criteria that will be used for the formative evaluation of the emergent educational program will include (1) relevance, (2) organization, (3) feasibility, (4) applicability, (5) comprehensiveness, (6) generalizability, and (7) transferability.

1. Relevance -- By involving community adults, parents, teachers, students, and school personnel in the planning process, issues and problems which have relevance for Memphis residents (including the student population) can be identified for each of the eight curricular themes identified in this project.

2. Organization -- The curriculum rationale presented provides an organizational framework for stating objectives and selecting activities for each theme. Thus, each module can be developed to insure scope, sequence, and integration.

3. Feasibility -- The cooperative planning by teachers, administrators, public school curriculum personnel, and university faculty can insure that feasible activities (in terms of developmental skills and abilities of primary, intermediate, junior high, secondary, and post-secondary students) are selected.

4. Applicability -- By utilizing the Kohlberg scheme of moral reasoning, feasible activities can be adapted by individual classroom teachers.

ENVIRONMENTAL THEMES
(PROJECT P.E.A.C.E.)

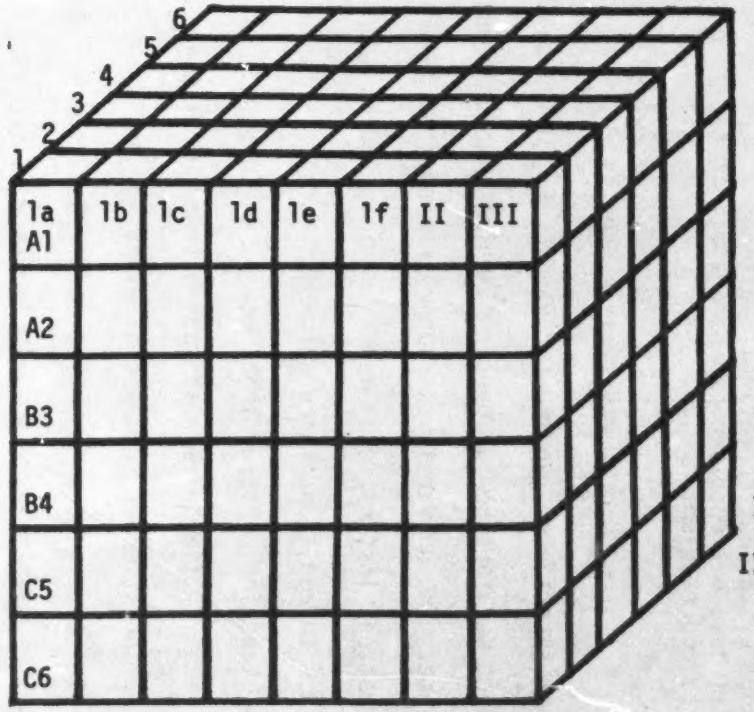
1. Urban Development & Planning
2. Social Services and the Urban Environment
3. Aesthetics and the Urban Environment
4. Economics and Politics of the Urban Environment
5. Cultural Dynamics in the Urban Environment
6. Responsible Use of Natural Resources
7. Leisure Activities in the Urban Environment
8. Transportation and Communication and the Urban Environment

Stages of Moral Development
(Kohlberg's Model)

A. Preconventional Level
   - Stage 1. Punishment/ Obedience
   - Stage 2. Instrumental/ Relative

B. Conventional Level
   - Stage 3. Interpersonal Orientation
   - Stage 4. Law and Order

C. Postconventional Level
   - Stage 5. Legalistic
   - Stage 6. Universal/ Ethical



Types of Objectives and Learning Opportunities
(Bloom's Taxonomy)

I. Choosing
   - a. Knowledge
   - b. Comprehension
   - c. Application
   - d. Analysis
   - e. Synthesis
   - f. Evaluation

II. Prizing

III. Acting

Organizing Centers (OC)
(Bennett's Conception)

1. Significance
2. Accessibility
3. Scope
4. Organizing Capacity
5. Mobility
6. Development

FIGURE 2
Matrix of Interrelationships and Interactions Among Curriculum Development and Instructional Variables in Project P.E.A.C.E.

5. Comprehensiveness -- Collectively, the eight instructional modules will deal with major aspects of each environmental theme identified as well as the interrelationships among these themes. Individually, each module will exhibit high face validity in terms of significant concepts, generalizations, and specific knowledge and also be a cohesive unit of related educational experiences.

6. Generalizability -- The instructional program and the curriculum development model will be applicable to different populations and locales on a horizontal axis and to different age levels or school organizational structures on a vertical axis.

7. Transferability -- The instructional modules as well as the curriculum development model will be transportable and useable across a broad range of various educational settings. Derived learning outcomes will have extended and expanded applications in other areas of the total curriculum.

IMPLEMENTATION PROCESS

Upon notification of funding for P.E.A.C.E., university personnel involved in the project met for the purpose of planning and implementing the first phase of the project. The university personnel represented general curriculum, science education, instructional media, social studies education, reading education, and research. In addition, three university graduate assistants with background in research, teaching, instructional media, and general curriculum participated in this meeting. A liason representative from the Memphis City School System was appointed and attended the initial planning session also.

Curriculum supervisors in social studies and science for each of the four administrative areas of the city were informed of the project and their commitment was solicited. These eight supervisors became active in selecting twenty-nine classroom teachers, four community representatives, four parents, and four principals who constituted the remainder of the curriculum development group.

Project personnel were organized into ten planning and writing groups. One team, consisting of two teachers and three administrators, worked together to

develop the Environmental Leadership Module. This module's main emphasis was to train public school administrators in the skills and knowledge needed to implement and administer an environmental education action program. The module dealt with the organization of the instructional program; the involvement of parents, community adults, and students both in developing and implementing a program within a local school and as participants in such a program; community relations; program evaluation; and other skills and knowledge felt to be vital in such a program.

A second team, composed of three teachers and one administrator, developed the Teacher In-Service Training Module. This module focused on the training of teachers in the skills and knowledge necessary for implementing an environmental education-action program within the framework of an urban community and incorporated within science and social studies curricula at the junior high level.

The remaining eight teams, each consisting of three teachers and a Memphis City School curriculum specialist, were assigned one of the following eight themes around which they organized and developed classroom instructional materials. These eight themes were:

a. Urban Environmental Development and Planning
b. Social Services and the Urban Environment
c. Aesthetics and the Urban Environment
d. Economics and Politics of Resource Management
e. Cultural Dynamics and the Urban Environment
f. Responsible Use of Natural Resources -- Environmental Ethics
g. Leisure Activities in the Urban Environment
h. Transportation and Communication and the Urban Environment

The activities in the eight instructional modules were designed to include different modes of instruction and levels of knowledge in order that learning experiences could be significant for students of various ability levels. The modules also contained a wide variety of instructional materials and activities -- games, films, field trips, simulations, role-playing, labs, discussions, and use of community resources. It was intended that these experiences should lead students toward "doing" rather than "talking about" problems in their environment. There was also included an emphasis upon involving significant community resource people in order to encourage more student-adult interaction. Most importantly, the program design was based on the belief that all activities should lead students toward an active role in actually solving some of the significant problems they would encounter.

Each instructional module was designed so that it could be taught independently of the other modules and in any sequence chosen by the instructor. The activities may be self-selected by students or by the instructor in accordance with general curriculum objectives, available resources, and student interest. In addition, they include large and small group as well as individual learning opportunities.

Under the leadership of the university staff, all participants spent seven hours a day for four weeks in July-August 1977, in developing materials. The first major task of each team was to develop specific curricular objectives to accomplish the following primary goals:

1. Implementation of an action-oriented and community-based curriculum project dealing with the preservation and enhancement of environmental quality and ecological balance within an urban area.

2. Utilization of the junior high school science and/or social studies curriculum framework for increasing awareness in the total community that the need exists for immediate solutions to and long-range planning for environmental problems unique to urban settings.
3. Education of citizenry in process of problem solving and of making intelligent value choices that can be translated into courses of action.
4. Development of intelligent strategies and actions for solving specific urban environmental problems.
5. Achievement of a fuller understanding of the urban environment, problems that confront it, the interrelationships between the community and surrounding land and opportunities for the individual to be effective in working toward the solution of urban environmental problems.

As the goals indicate, the problem solving process was the implicit focus around which the materials were designed. Thus, the following global objectives for achieving the major goals were developed:

1. The students will have knowledge of and be able to apply the problem solving process to environmental issues.
2. The students will be aware of environmental issues and work to a solution of at least two.
3. The students will be able to apply the valuing processes in the analysis of urban environmental issues.

The specific core objectives developed for the eight instructional modules were as follows:

1. The students will be aware of the contents of each module and will
   a. be able to define and describe a minimum of terminology/concepts related to this module
   b. be able to identify and be involved with at least two agencies connected with this module's topics

2. The students will become involved with at least one specific problem per module and derive a workable solution to each problem.
3. The students will demonstrate ability to apply valuing processes by stating pros and cons of alternatives of at least one problem explored in the module.

After the goals and objectives for the modules were developed, the teams began designing specific activities for accomplishing these goals and objectives. The time framework under which these major tasks were accomplished is indicated below:

Week 1, Day 1 - Introductions; project overview; environmental simulation; review of other environmental projects, materials and activities; group assignments for 10 modules; and preliminary group planning.

Day 2 - Community environmental resource persons' discussion of problems in Memphis area; group work session - writing of preliminary objectives and one student activity to facilitate one of the objectives; group sharing time.

Day 3 - Research and review of existing environmental materials and projects; field trips to community resource agencies.

Day 4 - Outline and basic components of module presented; module development begun by each group.

Day 5 - Module development - Refine global objectives and identify 10 topics within module around which activities will be developed.

Week 2, Day 1 - Complete one activity for each of 10 topics in each module; complete one motivational activity for four of the 10 topics.

Day 2 - Complete motivational activity for remaining six topics; complete two activities for each of 10 topics in modules.

Day 3 - Complete three activities for each of 10 topics in modules.

Day 4 - Complete activities for topics

Day 5 - Complete activities for topics; formative evaluation of work completed thus far.

Week 3, Day 1 - Refine and rewrite global objectives for module; refine and rewrite specific objectives for each topic area; refine and rewrite objectives for each activity developed thus far.

Day 2 - Develop activities; share ideas among groups.

Day 3 - Complete activities; exchange activities among groups and carry one through to completion.

Day 4 - Complete activities.

Day 5 - Complete activities.

Week 4, Day 1 - Write core concept for module; write core concepts for each of 10 topics within module.

Day 2 - Refine global and specific objectives and module and topic concepts, making certain that all are interrelated and coherent; groups exchange work and critique (formative evaluation).

Day 3 - Refine and rewrite activities; list topics and activities in order of priority for developing objectives.

Day 4 - Code topics and activities; refine and rewrite as needed.

Day 5 - Evaluation of final products and development process.

During the Fall Semester of 1977, the university personnel met for weekly planning and progress reports, worked on the final revisions of the ten modules' format and content, packaged the materials to be used with the modules, and prepared for the inservice and implementation phases of the project. The modules were typed and printed in adequate quantities for the implementation with classroom groups of students.

At the beginning of the Spring Semester of 1978, schools and teachers from the Memphis City Schools were selected for field testing the modules. The criteria used in selecting the school sites were as follows:

1. two schools from each of the four administrative areas
2. each school to include grades 7-9
3. a variety of physical settings represented among the participating schools
4. school not heavily involved with other experimental programs
5. class sizes average
6. facilities average to slightly above in quality
7. staff open to new ideas but not bandwagon jumpers

Twenty four teachers and 10 schools were selected to participate in the field testing. Of the 24 teachers, 12 were selected as a type of control or comparison group who would not receive formal inservice training, but would be given only the written inservice module prior to beginning the field testing of the instructional modules. The remaining 12 teachers were given a day and a half of inservice training conducted by university personnel one week prior to the beginning of the field test.

During the field-testing of the materials, university personnel are making regular visits to all schools for the purpose of observing and assisting teachers in the field testing. Each participating teacher is testing two of the instructional modules over a period of 10 weeks. At the conclusion of the teaching of the first module, another half-day inservice session will be held for the teachers as an opportunity for assessing their program and problems encountered. Evaluation data for the total project are being collected as described in a later section of this paper.

THE LEADERSHIP INSERVICE MODULE

One of the unique features of the PEACE project is that is provides a vehicle for familiarizing administrators with all aspects of the program. This feature was incorporated into the project as a result of a recognition that the

principals of schools using innovative programs need to receive some inservice training regarding the new curriculum. Without such training, administrators are unable to (1) adequately facilitate the implementation of the new program, (2) anticipate and deal with the possible problems that might arise, (3) intelligently answer questions from parents and the community regarding the new program, and (4) be familiar with the details of the program operation at the classroom level. The designers of the P.E.A.C.E. program realized the importance of these and other considerations for the successful implementation of the environmental curriculum. Thus, a leadership training manual was designed to be used individually or as a guide to a three-session inservice workshop.

All participating administrators are given a comprehensive overview of the development of the P.E.A.C.E. project. This review deals with the background of the project, the problems facing urban educators interested in developing and implementing effective environmental curricula, the major goals of the project, the global objectives of the program, and the core objectives for the eight instructional modules. The administrators are also made aware that the environmental curriculum is a multidisciplinary educational effort and that a wide variety of instructional materials are included. Also included is a brief summary of the themes of the instructional modules.

It is important that administrators incorporating the P.E.A.C.E. program in their schools be cognizant of the environmental problems which confront them daily. To develop an awareness of these environmental concerns, the administrators view a slide presentation of familiar areas within their community. This experience is totally visual. The participants have an opportunity to view each slide for approximately seven (7) seconds. A brain-storming session follows immediately for identifying environmental problems. Following the identification of problems,

the administrators determine what responsibility public education has for this topic, and how environmental education can be incorporated into the existing curriculum in their particular schools.

In order for the administrators to gain a more thorough understanding of the instructional modules and develop an understanding of the teacher's role in this program, it is necessary for them to review representative activities from the instructional modules. This review is done in conjunction with teachers so that the administrators will become more aware of the program process as well as any teacher concerns which may arise. Following the review of the module activities, the administrators observe a teacher question and answer session related to the above activity.

Two related activities are included in the leadership inservice to prepare administrators to deal with several major considerations in implementing the P.E.A.C.E. curriculum. In the first activity, eight types of administrative concerns provide organizing centers for thinking, decision-making, and planning. The eight areas of concern are: (1) advance planning, (2) communications, (3) supervision, (4) curriculum, (5) instruction, (6) school-community relations, (7) evaluation, and (8) post-evaluation activities. Specific objectives and exemplary questions are suggested to highlight issues and promote further inquiry and elaboration. The types of considerations, specific objectives, and exemplary questions are not comprehensive, but rather represent departure points. Other foci emerge as leaders begin dealing with these suggestions. Small group analyses and large group discussions are used to share ideas and develop leadership strategies in the first activity.

In the second activity, simulated situations that deal with selected administrative concerns are included. These situations enable leaders to apply the

generic problem solving skills utilized by the students and teachers participating in P.E.A.C.E. The skills of problem solving are: (1) defining the problem, (2) collecting and recording data, (3) formulating a hypothesis, (4) testing the hypothesis, and (5) drawing conclusions or formulating solutions. Eleven situations are described for use in applying the problem solving skills to problems that occur in the school setting.

Valuing is one of the goals of the PEACE curriculum and is one of the major responsibilities of the student, the classroom teacher, and the administrator. The leadership inservice points out that valuing activities enable students to practice and gain skill in the expression of values, feelings, ideals, and beliefs as well as help students gain ability to resolve problems as they arise and aids them in engaging in decision making processes. Valuing is one of the biggest concerns today in dealing with the environment and environmental issues. It is important to deal with the problems on a personal level and become aware of the methods of value clarification, problem solving, and decision making. Therefore, it is necessary that the administrators be exposed to the valuing process. This is accomplished with two activities that are designed to help leaders identify and clarify their own values and valuing strategies.

The inservice training is concluded with a general discussion (question/answer) session. By this time the principals have had an opportunity to become familiar with the parameters of the PEACE program, objectives, curriculum, and teaching strategies. Thus, they are able to ask questions and raise pertinent issues that will directly invlove their schools and personnel when implementing the program.

THE TEACHER INSERVICE MODULE

In order for teachers to maximize the potential of the P.E.A.C.E. instructional materials, a teacher training manual was developed. This manual is designed so that it can be used by teachers on an individual basis or as a guide for a three-session inservice workshop. Whichever approach is employed, it is felt that the manual is comprehensive enough to insure proper implementation of the PEACE curriculum.

The introduction to the manual is comprised of an abstract of the entire project as well as a section describing the need for this type of program, the goals of the project, the objectives of PEACE, and the philosophy and overview of the curricula materials. The teacher training manual also includes a brief synopsis of the eight instructional modules. Each instructional module contains a minimum of six and a maximum of ten subtopics. Within each of these subtopics, there are at least ten activities in which the students may choose to engage. The summary of each module subtopic identifies the major objective for the group of learning experiences as well as the types of activities and materals included.

The suggested teaching schedule presented in the manual covers a period of ten weeks. Specific suggestions for content, techniques, and methods are included. The first two weeks are devoted to understanding the problem solving processes and the steps involved in solving a problem. Emphasis is also placed on doing fun, interesting activities that will stimulate students to be motivated to use the modules.

Since the entire program is based on utilization of a problem solving approach, a significant portion of the teacher manual is devoted to this topic. It is the intent that teachers using these materials will focus on the problem solving process themselves first in order to understand it, and then work with their students to

help them refine their own problem solving skills. With this as a solid background, the teaching/learning process can then use this problem solving skill to attack local environmental problems.

In order to help teachers understand the problem solving process, it is necessary to actually go through the process, step by step, and experience both the actual outcomes of each step as well as what happens in the process of determining the outcomes at each point. Through a series of exercises, teachers gain actual experiences in working with problems and the process. Both rational and creative problem solving processes are applied in doing the exercises.

Environmental problems and issues are much more value problems than technical or social problems. Each of us has a value structure that strongly influences the selection of the various components of our life. In working with the problem solving process, the values are at work there too. Those issues that a person labels a "problem" directly relate to her/his value structure. According to Raths, valuing is composed of prizing one's beliefs and behaviors, choosing one's beliefs and behaviors, and acting on one's beliefs. These are closely tied to the processes of problem solving and in dealing with environmental issues. In order to gain an initial insight into the valuing process, the manual provides several suggested activities which individual teachers can pursue. Those teachers involved in the inservice workshop actually participate in the valuing process.

There are as many ways to integrate the P.E.A.C.E. materials into the curriculum as there are persons to do it. A number of examples are offered to give teachers ideas and stimulate their own creativity in their use. The focus in integrating the PEACE modules into the existing curriculum is placed on solving problems, reality within the student's community, all aspects of environmental problems, and active student involvement in the processes. The training manual provides suggestions for integrating the PEACE materials in the following curricular areas: social studies, science, language arts, mathematics, and art.

MODULE EVALUATION PLAN

The plan for evaluating the modules provides for assessing the effects of the two types of training modules as well as the eight instructional modules. Several project-developed instruments are used in conducting the evaluation.

Teacher Inservice Module

The instruments utilized to evaluate the teacher inservice module are the Teacher Inservice Module Evaluation Scale, the Environmental Attitude Scale, the Problem Solving Processes Inventory, and the Environmental Action Option Scale. These instruments are used with the teachers who receive the formal inservice training as well as those teachers who use the module on an individualized basis. The Teacher Inservice Response Scale is used with only the teachers who receive the formal inservice training.

The Teacher Inservice Module Evaluation Scale contains three parts with 10 items in each part. The first part assesses knowledge of the stated objectives of P.E.A.C.E. The second focuses on the topics that are addressed by the instructional modules. The last part evaluates knowledge of the instructional approaches used in the modules. The instrument was designed to assess the impact of the teacher training on the cognitive behavior of teachers by scoring the number of correct responses to the items.

The Environmental Attitude Scale consists of 20 items that deal with environmental conditions, issues, and potential courses of action in urban communities. The content of the items was derived from the objectives and activities of the instructional modules. Responses are made to the items using a five-point response scale with options ranging from Strongly Agree to Strongly Disagree. Numerical values are assigned to the response options, reversing the polarity of responses for negative items to provide a high positive score and a low negative score.

The Problem Solving Processes Inventory is comprised of two parts. The first part has 10 items stated in the form of questions that deal with the five steps involved in applying the rational problem solving process. The second contains eight items representing activities that are conducted in using the four steps of the creative problem solving strategy. In each part, the respondent marks for each item the response option that corresponds to the step to which the item is related.

The Environmental Action Options Scale consists of descriptions of two situations that require decisions which relate to the environment. For each situation, six response choices are provided that include a decision and a reason for the decision. The options for each situation represent the six levels of moral reasoning as described by Kohlberg. The respondent's score is obtained by summing the numerical values corresponding to the levels of the response options chosen for the two situations.

The Teacher Inservice Response Scale contains 17 items related to the formal inservice training of teachers. The items focus on the perceived impact of the inservice sessions as well as the procedures used and conditions under which the inservice is conducted. A five-point response scale, with options ranging from Strongly Agree to Strongly Disagree, is used in responding to the items. Scoring is accomplished by summing the numerical values assigned to the ordered response options.

The strategy for evaluating the teacher training module involves the use of a pretest-posttest design. For the teachers who participate in the formal inservice training, all of the instruments used with this module except the Teacher Inservice Response Scale are applied as pretests at the beginning of the training, posttests at the end of the training, and delayed posttests at end of field testing the instructional modules. The Teacher Inservice Response Scale is

administered as a posttest at the conclusion of the training. For the teachers who only receive the teacher's manual, all of the instruments except the Teacher Inservice Response Scale are used as pretests when the manuals are distributed and posttests when the instructional module field testing is completed.

Leadership Module

The leadership module is evaluated with the Leadership Module Evaluation Scale, the Leadership Inservice Response Scale, the Environmental Attitude Scale, the Problem Solving Processes Inventory, and the Environmental Action Options Scale. The latter three instruments are the same ones used with the teacher training module.

The Leadership Module Evaluation Scale consists of three parts with 10 items in each part. The first part deals with knowledge of the stated objectives of P.E.A.C.E. The second focuses on identifying the types of administrative considerations with which a series of specific questions are related. The third is concerned with knowledge of the instructional approaches used in the modules. The instrument is scored by determining the number of correct responses to the items.

The Leadership Inservice Response Scale has 12 items for evaluating the inservice training of leaders. The items deal with the respondents' perceptions of the impact, procedures, and arrangements of the inservice. The responses are made to the items using a five-point response scale with options ranging from Strongly Agree to Strongly Disagree. Numerical values are assigned to the ordered response options for scoring.

The design used in evaluating the leadership module is a pretest-posttest strategy. With the exception of the Leadership Inservice Response Scale, the instruments are administered as pretests at the beginning of the inservice

training, posttests at the conclusion of the training, and delayed posttests at the end of field testing the instructional modules. The Leadership Inservice Response Scale is used as a posttest at the end of the inservice training.

Instructional Modules

The eight instructional modules are evaluated by students using the Module Activity Questionnaire, the Problem Study Report, the individual module tests, the Environmental Attitude Scale, the Problem Solving Processes Inventory, and the Environmental Action Options Scale. The latter three instruments are the same tests that are used with the teacher inservice and leadership modules.

The Module Activity Questionnaire is utilized to obtain information and reactions concerning specific activities of the modules. Descriptive information is obtained on the number of students involved in the activity, the number and identity of contacts outside the school, and the amount of time devoted to the activity. The activity is rated on a ten-point scale with respect to clarity of the objective and instructions, quality of the work done, and interest level. The student's opinion is solicited concerning probable interest of other students in the activity. The quantitative data are compiled for analyses while the ratings are summarized using descriptive statistical procedures.

The Problem Study Report is completed by students to provide information on the specific problem explored by each student while doing each module. The report covers the problem statement, sources of information, possible problem solutions identified, recommended solution, and advantages and disadvantages of the recommended solution. The responses are summarized and compiled using categories determined on a post-hoc basis.

The individual module tests provide an assessment of students' knowledge of the terminology and concepts incorporated into the specific modules. Each

module test contains from six to ten words and terms that are to be matched with definitions presented on the instrument. The student's score is obtained by determining the number of correct matches made between words or terms and definitions.

The evaluation of the overall impact of the modules on students is made using the Environmental Attitude Scale, the Problem Solving Processes Inventory, and the Environmental Action Options Scale. These instruments are administered as pretests at the initiation of the ten-week field test of the instructional modules and posttests at the conclusion of the field test. The module tests are used as pretests and posttests for their respective modules. The Module Activity Questionnaire is completed when the students finish specific module activities. The Problem Study Report is submitted by students when they finish the problem exploration that is conducted while doing individual modules.

Data Analyses

A variety of descriptive and inferential statistical procedures are employed in analyzing the evaluative data that are collected. Frequency distributions are used to summarize narrative information. Quantitative data are analyzed to provide measures of central tendency and variability. Pretest and posttest scores are compared using appropriate t-test and analysis of variance procedures to ascertain the impact of the modules on their respective groups of subjects.

EDUCATIONAL IMPORTANCE OF THE PROJECT

Highlighted below are some of the major accomplishments of the ongoing research, which are suggestive of the educational importance of this undertaking. It must be recognized that there are a number of other significant achievements that are not elaborated in the present paper. Still other findings will emerge as the research continues to unfold. Perhaps, the most important point to remember is that the research in progress is not only accomplishing its established goals, but it is also identifying departure points for further research.

Major Accomplishments to Date

1. The theoretical curriculum model that was created for this project has been actually applied in practice. Tangible evidence of the operational success of this model is found in the Instructional, In-service, and Leadership Modules being utilized.

2. One of the most significant accomplishments of the project to date is the direct involvement of students with real-life environmental issues in their own urban community. These participating students are actively involved in a reality-oriented problem solving process with continued follow through. As noted in the professional literature, similar projects frequently involve students in artificial, remote, and preliminary steps of problem solving. Thus, these learning experiences are superficial and short-lived at best. In the current project, however, the students are engaged in identifying actual environmental problems in their everyday lives and pursuing the resolution of these problems through the problem solving process. Meaningful solutions are being generated by students interacting with adults, community representatives, educators, and governmental agencies. The significance of this accomplishment is that the students are actively involved in designing their own educational experiences.

3. Another important accomplishment is that the modules originally created by the teachers during the summer of 1977 have been edited and revised in such a way as to insure that the creators will recognize them as teacher-designed products. The modules were not modified, edited, and revised by outside "experts" to such a degree that the teachers who originally developed them would feel they were being asked to use so-called "teacher-proof" imported instructional packages. In effect, the users had the major input in developing their own educational tools.

4. The instructional modules developed also lend themselves to a variety of instructional organizational patterns, i.e., self-contained classroom situation, non-graded approach, open education, multi-grade grouping, and individualized approaches. Materials were designed so that students can work independently, in small groups, or large groups while engaged in these problem solving activities. Consequently, teachers with various styles or various teaching strategies can use these environmental education modules in a variety of teaching situations. These materials also are adaptable to students with varying ability levels.

5. Another accomplishment of the project is the continuing development of the Memphis State University faculty with regard to environmental education. During the early phases of the project, it has become evident that professors in education responsible for teaching teachers in areas of social studies, language arts, and science need more first-hand experiences in environmental education. The faculty involved in the current project has undertaken individual "Profession Growth". As a result of these initiatives, new activities are being introduced into existing college courses and new courses focusing on environmental issues are being proposed at the university.

6. The project also has increased interest in environmental education by (a) community agencies, (b) educational personnel, (c) local government agencies, (d) county government agencies, (e) state government agencies, (f) federal environmental agencies in the Mid-South region (Tennessee Valley Authority), and (g)utility companies (Memphis Light, Gas, and Water Division). As a result of their involvement in this project, new relationships and interactions have been stimulated among these various groups. The resources of numerous groups working independently are being brought together for the first time in many cases in a cooperative relationship. Thus, PEACE has served as a catalyst for organizing human, financial, and material resources that could be focused directly on environmental education both within the public schools and in the community at large.

7. PEACE also is impacting on the Memphis City School curriculum. It is filling the void in the existing curriculum described in the initial proposal. Until the present, there was very limited content concerning environmental education in either the science or social studies curriculum. Through the present project, there is an organized sequencial developmental science/social studies curriculum at the junior high school level that is being employed in the Spring of 1978. Specific instructional strategies and learning activities developed through this project also are being incorporated into the new curriculum currently being employed on a system-wide basis in the Memphis City School.

8. One of the most significant aspects of PEACE, as reported by public school personnel, is that it has the most complete involvement of administrators, curriculum specialists, supervisors, teachers, students and parents that has ever taken place in this large urban school system. This environmental education package was developed cooperatively by persons from all levels of the public school system as well as parents, teachers, and other lay persons interested in this topic.

9. Another outgrowth of this project is the increased knowledge base regarding environmental problems in the community. This came about by having the various target groups systematically analyze the environmental issues that affect their daily lives. Public school and university personnel, parents, and representatives from community agencies, some working together for the first time as a result of this project, were involved cooperatively.

10. Another outgrowth of this project is the vehicle PEACE provided for the Memphis State University personnel and Memphis City School personnel to collaborate on a cooperative basis. Together these two groups designed, developed, and demonstrated an effective working relationship among the various levels of educators from these two groups. In addition, it was demonstrated through students, parents, governmental units, and community action groups that various segments of the urban population can and do work together in a harmonious fashion when the right setting and atmosphere are created.

It appears that these foregoing achievements reinforce the validity, the efficiency, and the progress that has taken place during the first six months of the work of the personnel involved in P.E.A.C.E. They clearly indicate a need for expanding this environmental education program to other grade levels and possible environmental issues. It has become apparent that there are many other dimensions and issues that need further investigation beyond the scope of the immediate project.

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